Area Dose Product Calculation

Optimus RAD (+R/F) and SCP generators

Parameters required:

- cassette size RAD or II size R/F (via collimation parameters, SCP only)
- SID
- kV
- mAs (no matter which technique: kV falling load AEC, kV fixed current AEC, kV-mAs, kV-mA-ms, kV-mAs-ms)
- fluoro time and mA
- selected filter (Galileo and Nicol only)

Combinations of generators and collimators possible:

- Optimus RAD in combination with Galileo and Nicol collimators.
- Optimus R/F in an Easy Diagnost environment with Bucky unit attached, Galileo + Nicol collimators.
- SCP with automatic collimators XD 6026 and XD 6028.

Basics:

The size of the area covered by radiation increases with the square of the distance.
The air kerma decreases with the square of the distance.
The square increase of the distance and the square decrease of the air kerma cancel each other so that the area dose product is constant.

Nevertheless generators require the SID information to calculate (together with the collimator opening size) the basic value which has been measured and aligned at 100cm SID.

Calculation:

The kV dependent tube yield has to be measured and programmed to the generator.

With this the generator calculates a curve **dose [µGy] / mAs = f (kV)** for each tube.

air kerma = Q × specific yield
µGy = mAs × µGy/mAs

The formula to calculate the area dose product is: **air kerma** multiplied with the **area**

area dose product = air kerma × area

The measured dose at 100cm SID might e.g. be 700 µGy = 0.07cGy.
Multiplied with the collimated area 10x10cm = 100cm^2 at which the air kerma is measured one gets

0.07cGy × 100cm^2 = 7.0cGycm^2

displayed at the control desks as

7.0 cGycm^2 at **Optimus RAD + R/F** generators,

but with another calculation factor

0.7 dGycm^2 at **SCP** generators.